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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| Applicant's or agent's file reference<br>OPP030985KR | FOR FURTHER ACTION    See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
|---|---|---|
| International application No.<br>PCT/KR 2004/001780 | International filing date (*day/month/year*)<br>16 July 2004 (16.07.2004) | Priority Date (*day/month/year*)<br>18 July 2003 (18.07.2003) |

International Patent Classification (IPC) or national classification and IPC

$IPC^8$: G06F 1/32 (2006.01)l, H04L 12/28 (2006.01)i, H04L 12/54 (2006.01)l, H04L 12/16 (2006.01)i

Applicant

ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE

1. This international preliminary examination report has been prepared by this International Preliminary Examination Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of __5__ sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

   I.   ☒ Basis of the opinion

   II.  ☐ Priority

   III. ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

   IV.  ☐ Lack of unity of invention

   V.   ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

   VI.  ☐ Certain documents cited

   VII. ☐ Certain defects in the international application

   VIII. ☐ Certain observations on the international application

| Date of submission of the demand<br><br>17 February 2005 (17.02.2005) | Date of completion of this report<br><br>13 January 2006 (13.01.2006) |
|---|---|
| Name and mailing address of the IPEA/AT<br>Austrian Patent Office<br>Dresdner Straße 87<br>A-1200 Vienna<br>Facsimile No. 1/53424/200 | Authorized officer<br><br>ENGLISCH M.<br><br>Telephone No. 1/53424/565 |

## I. Basis of the report

1. With regard to the **elements of the international application:***

   ☒ the international application as originally filed

   ☐ the description:
   pages _____ , as originally filed
   pages _____ , filed with the demand
   pages _____ , filed with the letter of _____ .

   ☐ the claims:
   pages _____ , as originally filed
   pages _____ , as amended (together with any statement) under Article 19
   pages _____ , filed with the demand
   pages _____ , filed with the letter of _____ .

   ☐ the drawings:
   pages _____ , as originally filed
   pages _____ , filed with the demand
   pages _____ , filed with the letter of _____ .

   ☐ the sequence listing part of the description:
   pages _____ , as originally filed
   pages _____ , filed with the demand
   pages _____ , filed with the letter of _____ .

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
   These elements were available or furnished to this Authority in the following language _____ which is:

   ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in printed form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

   ☐ the description, pages _____ .

   ☐ the claims, Nos. _____ .

   ☐ the drawings, sheets/fig _____ .

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

   * Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as „originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).
   ** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

| INTERNATIONAL PRELIMINARY EXAMINATION REPORT | International application No. PCT/KR 2004/001780 |
|---|---|

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1.  Statement

| | | | |
|---|---|---|---|
| Novelty (N) | Claims | 1-20 | YES |
| | Claims | ____ | NO |
| Inventive step (IS) | Claims | ____ | YES |
| | Claims | 1-20 | NO |
| Industrial applicability (IA) | Claims | 1-20 | YES |
| | Claims | ____ | NO |

Citations and explanations (Rule 70.7)

The following documents have been cited in the Search Report:

D1: Woesner et al.; Power-saving mechanisms in emerging standards for wireless LANs: the MAC level perspective; Personal Communications, IEEE, Volume 5, Issue 3, June 1998; pages 40-48
D2: Kyu-Tae et al.; GLOBECOM'01. 2001 IEEE GLOBAL TELECOMMUNICATIONS CONFERENCE. SAN ANTONIO, TX, NOV. 25 - 29, 2001, IEEE GLOBAL TELECOMMUNICATIONS CONFERENCE, NEW YORK, NY : IEEE, US; 25.11.2001; pages 2932-2936; XP010747394; ISBN 0-7803-7206-9
D3: US6438375B1
D4: US5625882A
D5: US6622251B1

D1 provides an overview of mechanisms used for power saving in the standards fpr wireless LANs: IEEE 802.11 and ETSI RES 10 HIPERLAN. Power saving in HIPERLAN is based on a contract between at least two stations. The station that wants to save power is called p-saver, and the station that supports this the p-supporter. The p-saver is only active during prearranged intervals, while the p-supporter has to queue all packets destined for one of its p-savers and schedules the transmission of these packets during the active intervals of the p-savers. The p-saver transmitts a message that contains the lenght of the interval during which the p-saver is able to receive packets, the amount of time that has elapsed since the most recent start of the active interval, and the amount of time between the start of two successive active intervals .

The IEEE 802.11 Draft Standard proposes that stations in power save mode switch off the radio part for some period. They have to be synchronized to wake up at the same time when a window opens in which the sender announces buffered frames for the receivers.

| Supplemental Box |
| --- |
| (To be used when the space in any of the preceding boxes is not sufficient) |

Continuation of: Box V (page 1)

D2 features an energy efficient MAC algorithm based on reservation and scheduling for wireless ad-hoc networks. Two sorts of mobile terminals with full duplex operation in MAC scheme are mentioned, i. e. Pseudo base stations (PBS) and normal mobile terminals. The PBS that informs each normal mobile terminals when to wake up from idle mode or when to go to idle mode for its power saving manages a group of ad-hoc mobile terminals for energy efficiency and resource allocation.

Accordingly, all relevant features of the present application can be found when D2 is combined with D1 and therefore the subject-matter of the present application does not involve an inventive step.

D3 relates to wireless communication systems, and more particularly, to a method and apparatus for efficiently communicating different types of control messages between a radio network and a mobile radio station. Mobile stations may be divided into different paging groups with each paging group being assigned a particular timeslot on a paging control channel. Rather than all mobiles listening to the paging channel for pages all of the time, an idle mobile station needs only to wake up from sleep mode and monitor the particular timeslot on the paging channel assigned to the paging group to which the mobile station belongs. The mobile station can "sleep" during the other timeslots to save battery power. The amount of time the mobile spends reading paging messages and the time spent asleep represents a tradeoff between call setup delay and power consumption.

However, the power save mode is not entered after a communication between the mobile station and the base station which was initiated from the mobile station. Therefore, D3 merely represents the prior art.

D4 features a power management technique or strategy for use in a wireless communication system having a service access point (AP) and a plurality of mobile battery powered devices. In accordance with an aspect of the power management strategy, processing steps for determining when a device should switch from the sleep mode of operation to the active mode of operation, includes establishing a wake-up schedule identifying a plurality of synchronization signals to be monitored by a device, calculating an arrival time for each synchronization signal identified in the schedule as a function of their separation in time and upon the arrival of each of said synchronization signals as identified in the schedule, causing the device in the sleep mode to switch to the active mode of operation in order to monitor the synchronization signal's content. A Synch Signal may comprise synchronization information, control data, and an indication to a particular destination device that AP has information ready for transmission to that device.

However, there is no determining a sleep mode entering time in order to group listening intervals of a plurality of subscriber stations described in D4. Therefore it merely represents the prior art.

D5 is a document published prior to the international filing date of the present application, but later than the priority date claimed. D5 relates generally to the field of wireless Local Area Network (LAN) communications, and in particular to establishment and coordination

**Supplemental Box**
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Box V (page 2)

of mobile terminal sleep phases within the LAN. Since mobile terminals (MT) are often powered by finite sources such as batteries, the HIPERLAN Type 2 standard provides for a sleep mode for the MTs to conserve energy usage by the MTs. A MT sends a sleep request signal, which can include a suggestion by the MT as to how long the sleep interval should be, or in other words, the sleep duration, to an AP. The AP accepts the sleep request signal, decides the starting time and the sleep duration, and then sends a sleep reservation signal to the MT indicating the starting time at which the MT should enter the sleep mode, and the sleep duration or time the MT should remain asleep before "waking" to monitor the BCCH of a MAC frame from AP for the occurrence of DL data pending for the MT.

Therefore, all relevant features of the present application can be found in D5.

Industrial applicability is given.